

REMARKS

The objections raised to the drawings under 37 C.F.R. 1.83(a) are acknowledged by the Applicant. The power shift transmission T is now diagrammatically shown in the drawings. As there is support in the specification at least at page 1, paragraph 5 for this feature of the presently claimed invention, the Applicant does not believe that this is new matter. If any further amendment to the drawings or specification is necessary to place this case in condition for allowance, the Examiner is courteously invited to contact the undersigned Attorney of Record to discuss the same.

Claims 15, 16, 18-22, 24 and 26-29 are rejected, under 35 U.S.C. § 103(a), as being unpatentable over Gierer '862 in view of Gierer '930. The Applicant acknowledges and respectfully traverses the raised obviousness rejection in view of the following remarks.

As the Examiner is aware in order to properly support an obviousness rejection under 35 U.S.C. § 103(a) rejection, the applied Gierer '862 and '930 references must provide some disclosure, teaching or suggestion which would lead one of ordinary skill in the art to combine the references as suggested by the Examiner.

Gierer '862 discloses a well known hydraulic system to control a torque converter lock-up clutch, wherein the oil flow direction inside the torque converter has to be changed when closing the lock-up clutch. This means that the cooling system, i.e. oil cooler 39 must also be involved because the cooling oil flow always passes through the torque converter.

Firstly, when the lock-up clutch is open (i.e., not engaged) valve 15 controls the pressure inside the torque converter. Thus, when the lock-up clutch is open, there is no pressure inside pressure line 20 as seen in Fig. 1 of Gierer '862 and the cooling oil flows through the main pressure line 13 to a valve portion 26a/26b and hence via pressure line 27 to the converter chamber 10. The cooling oil passes through the space between the non-engaged lock-up clutch friction linings into the hydraulic circuit of the torque converter 3 and into the converter chamber 11. The cooling oil continues over pressure line 33 and valve portion 26a/26d to pressure line 28 that is also the input to the oil cooler 39.

Parallel to the above described cooling oil flow, lubrication oil flows over the main pressure line 13 and to leg 34, i.e., pressure line 34 to valve 35, wherein said valve 35 controls the lubrication pressure of pressure line 28/oil cooler input. Valve 15 can be best understood as a "converter pressure valve" which is essential for the function of the hydraulic circuit of the torque converter when the converter lock-up clutch is not engaged and valve 16 remains unactuated.

To close the converter lock-up clutch in Gierer '862, solenoid 17 sends pressure via line 20 to valve position 22 of valve 15 to close valve portion 26a, and also to valve position 23 of valve 16 to close valve portion 32c. Thus, valve 16 can be best understood as a "converter lock-up valve" that controls the engagement and the pressure of the converter piston 8 that is necessary to "lock-up" the crank shaft 1 and input shaft 5 and hence directly transmit the engine torque from shaft 1 to shaft 5.

As previously discussed, upon lock-up of the convertor, the oil flow direction inside the converter changes. The pressure flow now goes over main pressure line 13 and the now open valve portions 32a/32c to pressure line 33, then into converter chamber 11 working against lock-up piston 8 and closing the lock-up clutch 7. To prevent the lock-up clutch from overheating, a small rate of cooling oil has to pass the engaged lock-up clutch 7, for example, using grooves of the lock-up clutch friction lining or a bore axially through the converter piston 8 to converter chamber 10. Said heated oil now flows through pressure line 27, and the now open valve portions 26b/26c directly to the oil sump of the transmission. The oil cooler 39 is now only discharged by the lubrication valve 35 because the valve portion 26d of valve 15 is now closed.

It should be quite obvious from the above discussion and even a cursory review that the hydraulic system disclosed by Gierer '862 works only in combination with a torque converter having an internal lock-up clutch and only two pressurized connections.

Different from both the present invention and Gierer '862, Gierer '930 relates to a differential transmission clutch to interlock a front axle with a rear axle of a 4-wheel driven car. Arguably valve 13 controls the pressure of said clutch during engagement of the clutch 30, however valve 6 is only working as a security valve to damp the oil pump dependent pressure vibrations of the main pressure being the input pressure of the clutch valve 13. To do this, valve 6 includes a special spring-accumulator damper.

Primarily, the Applicant argues that the system of reversing the pressure feed to control the lock-up clutch and the convertor lubricant supply as disclosed in Gierer '862 is entirely specific to the torque convertor and lock-up clutch described therein. Similarly, the electrohydraulic actuation system for actuating the clutch of a differential transmission as in Gierer '930 between an automatic transmission and the drive wheels of a vehicle is entirely specific to operation of the differential transmission. A thorough study of Gierer '930 fails to reveal any disclosure, teaching or even a suggestion that such a system would be useful with a hydrodynamic torque convertor and an associated lock-up clutch. Furthermore the stated purpose of the safety valve 6 is specifically to alleviate pressure fluctuations and natural vibrations in the hydraulic circuit for the differential transmission.

Even if it is possible to combine the references, and the Applicant adamantly denies that it is, a combination of the applied references would only teach to combine the safety valve 6 and damping system of Gierer '930 with the hydraulic converter lock-up system disclosed by Gierer '862. A true combination of the teaching from both references results in the location of the safety valve 6 damper between the pressure line 13 in Gierer '862 and the valve portion 32 of the convertor lock up clutch valve 16 to discharge said converter lock-up valve 16 with reduced pressure vibrations during engaging the lock-up clutch, this is highly different from the Applicant's presently claimed invention.

In addition to the above discussed differences in arrangement of the elements between the cited references and the present invention, claim 15 has been slightly amended to better conform to U.S. claim drafting practice. Amended claim 15 is also slightly amended to more

clearly set forth the recited feature, "wherein both first and second surfaces (A_1, A_2) of the clutch piston (3), when the shifting element is engaged, are correspondingly pressurized up to a pre-defined pressure-adjuster control pressure (p_{EDS_2}) with at least approximately the same pressure." Neither of the references either alone, or in combination disclose, teach or even suggest such a feature where the pressures on both sides of the piston, i.e., piston spaces 4,5 are substantially equal as claimed by the Applicant. This novel aspect of the present invention is clearly shown in Applicant's Fig. 2 as the pressure diagram of the rise and run of p_1 corresponding to p_2 between p_{EDS_1} and p_{EDS_2} . The specification clearly discusses this claimed aspect of the present invention at least at page 11, paragraph 62.

In other words, the claimed arrangement of the clutch valves 8, 9 and at least the holding valve 11, essentially balances the clutch piston 3 so that with the same pressure on both sides, only the differential surface between the surfaces facing the clutch space and the reset space produces an effecting force on the clutch piston 3. In this state, where the system is at its most insensitive position relative to the pressure fluctuations, and dissolution of the transmitted torque to the quantity of output signal is at its most sensitive, it is possible to actuate shifts that are especially critical for shifting quality.

As the cited references fail to disclose, teach or suggest at least the above recited feature of the present invention, the Applicant respectfully requests withdrawal of the obviousness rejection. If any further amendment to this application is believed necessary to advance prosecution and place this case in allowable form, the Examiner is courteously solicited to contact the undersigned representative of the Applicant to discuss the same.

In view of the above amendments and remarks, it is respectfully submitted that all of the raised obviousness rejection should be withdrawn at this time. If the Examiner disagrees with the Applicant's view concerning the withdrawal of the outstanding rejection(s) or applicability of the Gierer '852 and '930 references, the Applicant respectfully requests the Examiner to indicate the specific passage or passages, or the drawing or drawings, which contain the necessary teaching, suggestion and/or disclosure of each claimed feature of the Applicant's

invention required by case law. As such teaching, suggestion and/or disclosure is not present in the applied references, the raised rejection should be withdrawn at this time. Alternatively, if the Examiner is relying on his/her expertise in this field, the Applicant respectfully requests the Examiner to enter an affidavit substantiating the Examiner's position so that suitable contradictory evidence can be entered in this case by the Applicant.

The Applicant thanks the Examiner for indicating that claims 17, 23 and 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims. Accordingly new claim 30 includes the subject matter of claims 15 and 17 and thus is believed to be allowable. As claims 31-43 are directly or indirectly dependent upon claim 30 these claims are believed allowable as well.

In view of the foregoing, it is respectfully submitted that the raised obviousness rejection(s) should be withdrawn and this application is now placed in a condition for allowance. Action to that end, in the form of an early Notice of Allowance, is courteously solicited by the Applicant at this time.

The Applicant respectfully requests that any outstanding objection(s) or requirement(s), as to the form of this application, be held in abeyance until allowable subject matter is indicated for this case.

In the event that there are any fee deficiencies or additional fees are payable, please charge the same or credit any overpayment to our Deposit Account (Account No. 04-0213).

Respectfully submitted,



Scott A. Daniels, Reg. No. 42,462
Customer No. 020210
Davis & Bujold, P.L.L.C.
Fourth Floor
500 North Commercial Street
Manchester NH 03101-1151
Telephone 603-624-9220
Facsimile 603-624-9229
E-mail: patent@davisandbujold.com